rise. The correspondence or opposition of departures at widely separated stations simultaneously or after an interval of months, as well as the high correlation coefficients, are strongly indicative of successful long-range weather forecasting.—*C. F. B.*

Cool northeastern high ends hot spell.—The excessive hot spell in the northeastern United States the first days of September, 1929, was brought to an early close in New England by the typical development of a high pressure over the St. Lawrence estuary, New Brunswick, Me., and the Gulf of Maine. Over this cool water and near-by land, the pressure rose nearly 0.2 inch from the morning of September 3 to September 4. Half of this rise might have been expected from the movement of the northern tip of the southeastern high eastward, the other half of the pressure rise seems to have been due to the differential temperature of the cool region and the exceedingly hot one close by to the southwest and west. The temperature at Father Point, Quebec, on the south shore of the St. Lawrence estuary, ranged from 46° to 56° F. September 3, while that at Northfield, Vt., ran from 72° to 92° F.

As the northeastern high developed, the cool air ran out from its center westward under the hot southwesterly wind, bringing a welcome relief to most of New England by the morning of September 4. In New Hampshire and southern Maine the cool sea wind running under the hot wind produced a dense, mammillated stratus cloud moving from the SSE. at a (mountain measured) height of about 2,000 feet that lasted throughout the 4th. At night scattered warm-front thunderstorms, probably formed in northern New York and southwestern Quebec, drifted by.

The following day saw the atmospheric structure still more complex, for a slightly cooler north wind set under the now warmer (?) easterly wind from farther (?) out to sea, producing a still lower (1,500 feet) raggedly festooned stratus moving from the east. A light drizzle, increasing toward evening, fell all day in central New Hampshire. Presumably there was a fourfold layer structure to the atmosphere—the cool north wind at the ground, the cool, damp east to southeast wind next above, and the warm southwest and the cooler west to northwest winds at higher altitudes. With clouds at probably four levels, the day was the darkest one in a long time.

September 6 saw the beginning of showery weather, with southerly wind and very low clouds but more changeable sky brightness as the warm front of the oncoming low approached.

One of the unfinished minor projects of the late Dr. C. LeRoy Meisinger was a study of these northeastern highs that ended hot spells in New England so much sooner than in the Middle Atlantic States. An aerological investigation that would show whether, and, if so, how the heated expanded air from the eastern United States drifted northeastward and collected over the cool regions, thereby producing such highs should not only be full of interest but also very helpful in forecasting the termination of the excessive heat.—*Charles F. Brooks.*

Probable origin of the cold wave in India, February, 1929.—During the period January 28–February 3, 1929, an intense cold wave overran the whole of northwest and Central India, where surface temperature went down to about 12° C. below normal, several stations recording the lowest temperature in the last four or five decades. The results of a few soundings over Agra, which reached the stratosphere during and after the passage of the cold wave, appear to throw some light on the origin of the cold air. During winter the normal height of the tropopause over Agra (latitude 27°) is about 14.5 geodynamic kilometers and its temperature is 206° A. (see Doctor Ramanathan's Figure 1, Nature, June 1, p. 834, reproduced on p. 382), while with the invasion of the cold wave the base of the Agra stratosphere came down so low as 11.5 geodynamic kilometers and its temperature rose to 213° A. The conditions in the troposphere and the stratosphere over Agra during the cold wave were similar to those normally found at about latitude 40°. The trajectories of pilot-balloon flights up to 6 kilometers indicate that the cold air came from the northwest. It would thus appear that the cold wave had its origin somewhere to the east of the Caspian Sea.—*S. C. Roy* and *G. Chatterji.*

Droughts in September.—Press reports bring an unusually large number of accounts of drought in various parts of the world. Not since 1893 has Great Britain experienced a more prolonged drought nor has Greenwich recorded a rainless month—as this is likely to be—in 90 years. Farmers are finding the absence of rain very serious. (Daily Telegraph, September 26, 1929.)

The Times, London, of September 18, 1929, reports the long drought at Paris, France, as ended on the 17th. This drought was the second longest since 1873. In 1895, 38 days passed without rain—August 24 to October 2.

From the Fort Dodge, Iowa, Messenger of October 10 it is learned that nearly 6,000 families in Saskatchewan, Canada, will need government aid through the winter. While all of the western Canadian provinces have suffered from lack of rain, Saskatchewan seems to have been the center of the afflicted area.

The Sioux City, Iowa, Journal of October 9, 1929, prints an account from its correspondent in the Argentine, dated Cordoba. In the State of that name little or no rain has fallen in the last six months, the wheat crop is a failure, and unless rain comes within 10 days the corn crop will be in danger. (Subsequent reports, however, show that the rains came on October 22.)

The French daily weather report.[1]—The French Meteorological Service has for some time issued its daily weather report in two parts, the Bulletin Quotidien de Renseignements and the Bulletin Quotidien d'Etudes. The idea of separating the report into two parts, one for general use and one for students of meteorology seems a good one, but the separate purpose of the parts as indicated by their titles has not been fulfilled very clearly in the past. Each part has consisted of four single pages and has contained both tabular matter and charts; the station reports have been divided into two groups, those from French stations being published in the Bulletin Quotidien de Renseignements and those from "foreign" stations in the Bulletin Quotidien d'Etudes.

From July 1, 1929, the form of the report has been altered and it is interesting to note the manner in which General Delcambre, the head of the Office National Météorologique, has endeavored to meet the requirements of the French public, both those seriously interested in meteorology and those whose interest is more superficial. The Bulletin Quotidien de Renseignements has been reduced to a single sheet providing two pages of the same size as those of our own Daily Weather Report, while the Bulletin Quotidien d'Etudes has been expanded to a publication of four sheets, that is, eight single pages. The annual subscription for the latter is 320 francs as against 140 francs for the more modest single sheet of the former.

[1] Reprinted from Meteorological Magazine, August, 1929.

The Bulletin Quotidien de Renseignements in its simplified form contains a 7 a. m. chart for northwest Europe and the eastern Atlantic, on which are entered winds, isobars, and lines showing the change of pressure in the past 24 hours. Beneath this map are forecasts given separately for the region around Paris and for the whole of France. On the reverse side there is a smaller map showing changes of pressure in the past three hours with large arrows indicating the direction of movement of the isallobaric systems; also charts of maximum and minimum temperature and rainfall. The different phases of the système nuageux, of which so much use is made in French forecasting, are indicated on another map which shows the state of the sky at 7 a. m., the regions in which the several types of cloud formation prevail being indicated by distinctive symbols. This report seems admirably to fulfill its purpose of being a simple and (if we except the système nuageux) nontechnical publication.

The Bulletin Quotidien d'Etudes in its new form commences with tables of readings at 7 a. m., 1 p, m., and 6 p. m., for French stations together with aerological reports, while the last page contains a small table of ships' reports from the Atlantic and Mediterranean. It is interesting to note that readings from foreign stations no longer find a place in the report. More than one-half of the eight pages are devoted to charts. In the first of these, which is reproduced as the frontispiece of this number of the magazine, polar fronts appear for the first time in the French daily weather report. The chart is an ambitious one showing isobars and fronts over the whole of that part of the Northern Hemisphere which extends from Europe in the east to eastern Canada, the Great Lakes, and part of the United States in the west. The fronts are shown very clearly, by broken lines for a warm front and a row of black dots for a cold front. Fronts are often difficult to locate; sometimes their very existence is doubtful. Further, they vary greatly in intensity and importance and it therefore seems regrettable that no observations are entered on the chart to help the student to judge of the nature of the fronts and of their effect on the weather in the vicinity. The chart on which these fronts are shown is for 1 p. m. G. M. T. A Northern Hemisphere chart for 1 a. m. covering an area centered at the pole occupies most of the last page of the report, and shows isobars but not fronts.

The importance attached to isallobars in France is shown by the inclusion of six small charts of changes of pressure in the periods of 24 hours, 12 hours and 3 hours respectively, ending at 7 a. m. and again for the same periods ending at 6 p. m. The only forecasts contained in this report are in the form of two charts, one for the anticipated changes of pressure in the 12 hours ending at 7 a. m. the following morning and the other for the state of the sky and the wind anticipated at this hour. Alongside these two charts are written an analysis of the situation and some comments on the reasons which have led to the deductions drawn. The report appears to be issued on the day following that to which it refers, as a short critical discussion is included of the success or otherwise obtained in the forecasts. Such a discussion is likely to be of value by giving the reader an insight into the lines on which the forecasters work, and may in addition be helpful to the forecasters themselves. Curves showing the daily march of temperature both at the summit of the Eiffel Tower and in the courtyard of the Office National Météorologique are also included in a report, the form of which suggests a considerable appetite for meteorological information amongst French students of meteorology.—*J. S. Dines.*

Fire weather investigations in Wisconsin.—Foremost in importance in any plan to grow forest trees is the control of fire, for upon such fire control depends the very existence of the forest. That weather conditions very largely determine the occurrence and severity of forest fires is obvious. Just what the conditions are that spell low or high hazard, however, has never been definitely determined for the Lake States region. To secure this information, a study of fire weather and the hazard resulting was started in the spring of 1928 by the cooperating agencies.

Early in May temporary field stations were established in northeastern Wisconsin in typical jack pine and hardwood areas. At each of these stations during the spring fire season observations were made daily at 8 and 11 a. m. and 2 and 5 p. m. of the conditions prevailing in the open, in the forest, and on partially cut-over areas. The resulting inflammability and moisture content of the litter was also determined at frequent intervals. In addition, the occurrence of fires in the protection districts adjoining the stations was noted and the behavior of going fires observed wherever possible, as was also the character, amount, and distribution of inflammable material typical of the two forest types under observation.

While the data secured have not yet been worked up in detail, a very direct relation between the inflammability of the prevailing forest fire fuels and weather conditions, particularly precipitation and relative humidity is obvious. For example, each of the three critical periods encountered this spring were preceded by from four to eight days without precipitation and with a mid-day humidity of 40 per cent or less. The moisture content of the litter during dry periods also was found to vary directly with the humidity, explaining why fires burn more fiercely between noon and 4 p. m. and are more readily controlled in the morning and late afternoon. Wind velocity was also found to be an important factor when other conditions were favorable for the occurrence of forest fires, velocities of seven miles per hour and over causing fires to spread rapidly and making control difficult.

The spring fire season in northeastern Wisconsin this year (1928) was acute but not abnormal. * * *

The lowest humidity observed was 21 per cent in the open jack-pine country at 5 p. m. on June 6, the last bad fire day of the season. While the humidity tended to run somewhat higher in the hardwood than in the jack-pine country, days with humidity of 30 per cent and less were numerous at both stations. Decidedly higher humidities and a consequent higher moisture content of the litter normally prevailed at the forest stations than in the open in both hardwood and pine, conditions in partially cut-over stands being intermediate. This difference was particularly striking in the hardwood country after the leaves had come out, but also prevailed consistently in jack pine.

On the other hand, light rains were found to be more effective in the open than in the forest, the forest cover evidently preventing the precipitation from reaching the ground. As a result, normal conditions were found to be reversed by light rains, the litter in the forest remaining dry and hence more inflammable than that in the open.

* * * Just what conditions cause fires, apparently dead beyond the possibility of revival, to flare up after lying dormant for days is worth knowing. This spring a fire of this kind occurred in northern Wisconsin in the area that was being covered by this fire-hazard study.

As long as the relative humidity at 8 a. m. was 50 per cent or above the fire remained dormant. However, when the humidity dropped appreciably below 50 per cent